

DESIGN AIDS

Surface Water Management Design Aids

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This part of "Design Aids" is a compilation of suggested methods and information that can be used to design a surface water management system. Included are a set of drainage basin maps and information on many topics including rainfall, water table, runoff, water storage, weirs, orifices, exfiltration trenches, hydrographs and flood routings. The methods and information do not constitute additional rule criteria, and should not be used in lieu of adopted criteria or in a manner which is inconsistent with duly-adopted rules.

The **Drainage Basin Maps** section consists of maps, created in 1996, which show the major drainage basin boundaries within the District. The allowable discharge from a project is based upon the location of the project in relation to the receiving surface watercourse. The allowable discharge for District canals is based on the formulas, factors, and equations shown in Appendix 2 of the *Basis of Review*.

The **Rainfall** section includes isohyetal maps, taken from the District *Technical Memorandum Frequency Analysis of One and Three-Day Rainfall Maxima for Central and Southern Florida October 1990*, for storm events with return frequencies of 5, 10, 25 and 100 years. Storm event durations are 24 and 72 hours in all instances, except for the 5 year storm. That storm is described as only a 24-hour duration event. There are two rainfall distribution patterns that are most frequently utilized in applications submitted to this District: 1) "SFWMD", which was developed by this District and is similar to the Soil Conservation Service (SCS) (now the Natural Resource Conservation Service (NRCS)) Type 2 distribution, and 2) "Orange County", which was developed by Orange County for use in that area.

The **Determination of Seasonal High Water Table** section provides an in-depth discussion of the methodology and indicators used to establish the elevation of the seasonal high water table. Definitions of all indicators are provided, as well as a checklist of the indicators with notes on characteristic features.

The **Runoff** section contains a method for estimating the volume of runoff from rainfall information. The method was developed by the NRCS and was derived from experimental data. Sheetflow runoff rates can be estimated for undeveloped watersheds by utilizing the sheetflow runoff curves presented herein. Runoff rates obtained in this manner should be adjusted for any depressional storage that may be present on site. Most applicants are aware that there are numerous methods for computing runoff rates and volumes. Many of these methods have been converted into computer software. The District allows the use of any method that can be shown to be applicable to design conditions within the SFWMD.

The **Water Storage** section is in two parts: surface and soil. Surface storage is relatively easy to comprehend and calculate. Soil storage, on the other hand, is dependent on several variables including soil type and compaction. The NRCS has furnished additional data, describing soil storage volumes for specific soil types, that have been included in this section.

The **Exfiltration Trenches** section has only one change since the last revision. A third frequently used method for determining the hydraulic conductivity, the Florida Department of Transportation test method, is now provided.

The **Water Quality** section contains selected material from Chapters 62-4 and -302, F.A.C. The material sets forth the State anti-degradation policy requirements for projects which are proposed to discharge into Outstanding Florida Waters.

The **Discharges** section presents several types of structure designs which regulate the flow of water. Free and submerged weir flow are described in addition to v-notch and orifice flow. Once the initial structure design is decided upon, the applicant is advised to verify that the water control structure is regulating the project discharge and not the culvert (if any) downstream of the structure.

Discussions of **Hydrographs** and **Flood Routing** complete this part. While there are several methods for determining the shape of a runoff hydrograph only one is described in detail. The Santa Barbara Urban Hydrograph (SBUH) method produces results which correlate well with gauged watersheds in south Florida. While the NRCS curve number method is also useful in generating an instantaneous runoff hydrograph for small projects, the SBUH method should give a more realistic representation for larger, more complicated projects.

For projects with numerous drainage basins, there are an ever-increasing number of software programs available to generate runoff hydrographs and route them through a water management system. One of these is the Multi-Basin Routing Model (MBR) developed by the SFWMD. This program has the ability to analyze multiple cascading basins interconnected by multiple discharge structures. The program may be obtained from the District's Surface Water Management Division.

The District will allow the use of any hydrograph generating and routing model that can be configured to duplicate accurately the ambient design conditions applicable to projects within the SFWMD.